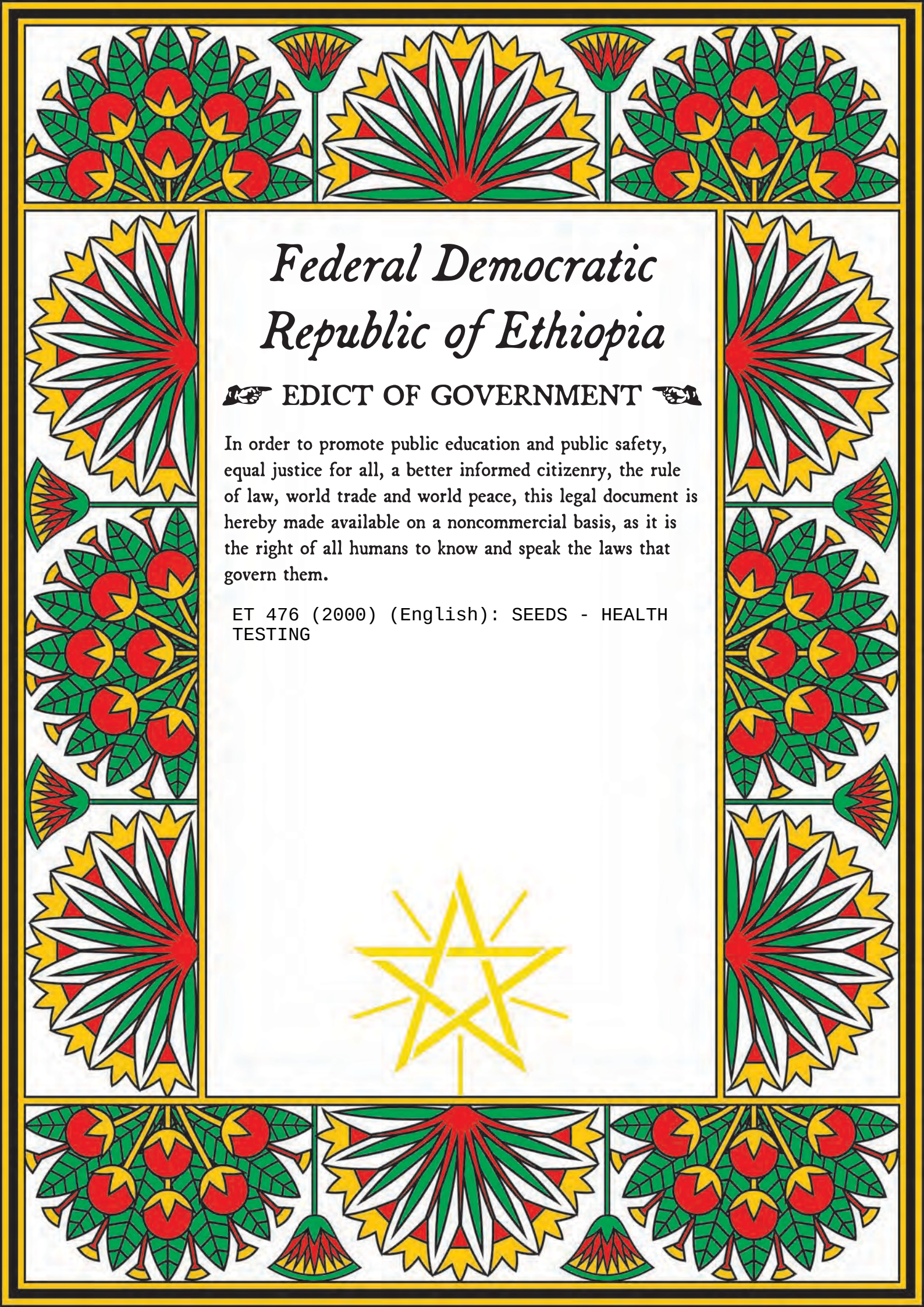




Federal Democratic Republic of Ethiopia

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ET 476 (2000) (English): SEEDS - HEALTH TESTING



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**ETHIOPIAN
STANDARD**

ES 476:2000

(Reaffirmed :2012)

First edition

Seed – Health testing

ICS: 65.020.20

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Foreword

This Ethiopian Standard has been prepared under the direction of Technical Committee for seeds (TC 16) and published by the Ethiopian Standards Agency (ESA).

The technical contents in the text of this Standard are identical with ES 476:2000 edition while the reissued standard carries some editorial and technical changes observed in the course of systematic review.

Acknowledgement has been made for the use of the indicated publication.

All Ethiopian Standards whether they are adoption of International Standard such as the ASTM ISO and IEC or not, are subject to copy right protection.

Seeds — Health testing

1 Scope

This Ethiopian Standard specifies the method for determining the health status of a seed sample, and by inference that of the seed lot, thus gaining information that can be used to compare the value of different seed lots.

2 Normative references

The following standard contain provision which, through reference in this text, constitute provision of this Ethiopian Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this Ethiopian Standard are encouraged to investigate the possibility of applying the most recent editions of the Ethiopian Standards indicated below. Registers of currently valid standards are maintained in the Quality and Standards Authority of Ethiopia.

ES 413:2000, *Seeds – Terminology*.

ES 471:2000, *Seeds – sampling*.

3 Definitions

For the purpose of this standard, the definitions in ES 413 and the following shall apply.

3.1

seed Health

the presence or absence of disease causing organisms, such as fungi, bacteria and viruses, and animal pests, such as eelworms and insects, but physiological conditions such as a trace element deficiency may be involved

3.2

incubation

maintaining seeds in an environment favourable to the development of pathogens or symptoms

3.3

pretreatment

any physical or chemical laboratory treatment of the working sample preceding incubation, given solely to facilitate testing

3.4

treatment

any process, physical or chemical, to which a seed lot is submitted.

4 Principle

4.1 The presence or absence of disease organisms, pests and deleterious physiological conditions specified by the sender shall be determined and the number of seeds so affected in the sample shall be estimated accurately as the method used permit.

4.2 The determination may be influenced by treatment applied to the seed lot. Therefore, if treatment has been applied, the sender shall be required to specify the type of treatment and the chemicals used.

5 Sampling

Samples shall be taken in accordance with ES 471.

6 Procedure

6.1 The entire submitted sample or a proportion of it, depending on the test method, shall be used as a working sample.

6.2 Exceptionally, a submitted sample larger than that prescribed in ES 471 may be required and in such cases the sampler shall be instructed accordingly.

6.3 When a portion of the submitted sample is required as a working sample, the reduction shall be carried out in accordance with sub-clause 9.1 of ES 471.

6.4 Normally the working sample shall not be less than 400 pure seeds or an equivalent weight taken from the sample as submitted.

6.5 Replicates containing a specified number of seeds, if required, shall be taken at random from a sub-sample after thorough mixing.

6.6 General directions

Different methods of testing are available, varying in sensitivity and reproducibility and in the amount of training and equipment required. The method used shall depend on the pathogen or condition to be investigated, the species of the seed, and the purpose of the test. Selection of the method and evaluation of the results requires knowledge and experience of the methods available.

In a test, the working sample shall be examined with or without incubation. Growing plants may also be examined when necessary.

6.7 Examination without incubation

such tests shall give no indication as to the viability of the pathogen.

6.8 Direct examination

The submitted sample, or a sub-sample from it shall be examined, with or without a stereoscopic microscope and searched for ergots and other sclerotia, nematode galls, smut-balls, insects, mites and evidence of diseases and pests on seeds matter, such as fruiting bodies, discoloration and damage.

6.9 Examination of imbibed seeds

The working sample shall be immersed in water or other liquid to make fruiting bodies, symptoms or pests more easily visible, or to encourage the liberation of spores. After imbibition the seeds shall be examined either superficially or internally, preferably with a stereoscopic microscope.

6.10 Examination of organisms removed by washing

The working sample shall be immersed in water with a wetting agent or in alcohol and shaken vigorously to remove fungal spores, hyphae, nematodes, etc, intermingled with or adhering to the seeds. The excess liquid shall then be removed by filtration, centrifugation or evaporation and the extracted material examined by compound microscope.

6.11 Examination after incubation

6.11.1 After a specific period of incubation the working sample shall be examined for the presence of or symptoms of disease organisms, pests and physiological disturbance on or in the seeds and on seedlings. The examination may be superficial, or internal. The following three types of media shall be commonly used.

6.11.2 Blotters are used when it shall be required to grow the pathogens from the seeds or examine the seedlings. The seeds, with or without pretreatment, shall be spaced during incubation so as to avoid secondary spread of organisms. Light conditions calculated to stimulate speculation of fungi shall be supplied when appropriate. Germination inhibition by chemical or other means shall sometimes be desirable. Some pathogens can be identified without magnification, but a stereoscopic microscope shall often be necessary, or a compound microscope for identifying spores.

6.11.3 Sand, artificial composts and similar medicine may be used for certain pathogens. The seeds, usually without pretreatment, shall be sown suitably spaced in the medium so as to avoid secondary spread of organisms and incubated in conditions favourable for symptom expression.

6.11.4 Agar plates shall be used to obtain identifiable growth or organisms from seeds. Careful sterility precautions shall be required. The seeds, normally after pretreatment, shall be spaced on the surface of sterilized agar and incubated. Characteristic colonies on the agar can be identified, either macroscopically or microscopically. Lighting shall often be useful and germination inhibitors may be used.

6.12 Examination of growing plants

The growing of plants from seed and examining them for disease symptoms shall sometimes be the most practicable procedure for determining whether bacteria, fungi, or viruses shall be present in the sample. Seeds from the sample under test may be sown, or inoculum obtained from the sample may be used for infection tests with healthy seedlings or parts of plants. The plants must be protected from accidental infections from elsewhere and conditions may require careful control.

7 Expression of results

Results shall be expressed as percentage by number of seeds affected or as number of organisms in the weight of sample examined.

8 Test report

The test report includes the following information:

8.1 The result shall be reported on a certificate stating the Latin names of organisms which affect the health of the seed and it shall be accompanied by a statement of the test method used, including any pre-treatment applied, and the amount of the sample as fraction examined.

8.2 The absence of a statement concerning the health condition of the seed shall not necessarily imply that the health condition shall be satisfactory.



Organization and Objectives

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ESA's objectives are:-

- ❖ Develop Ethiopian standards and establish a system that enable to check whether goods and services are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.

Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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